The Impact of the SARS Epidemic on the Utilization of Medical Services: SARS and the Fear of SARS

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Using interrupted time-series analysis and National Health Insurance data between January 2000 and August 2003, this study assessed the impacts of the severe acute respiratory syndrome (SARS) epidemic on medical service utilization in Taiwan. At the peak of the SARS epidemic, significant reductions in ambulatory care (23.9%), inpatient care (35.2%), and dental care (16.7%) were observed. People's fears of SARS appear to have had strong impacts on access to care. Adverse health outcomes resulting from accessibility barriers posed by the fear of SARS should not be overlooked. (*Am J Public Health*. 2004;94:562–564)

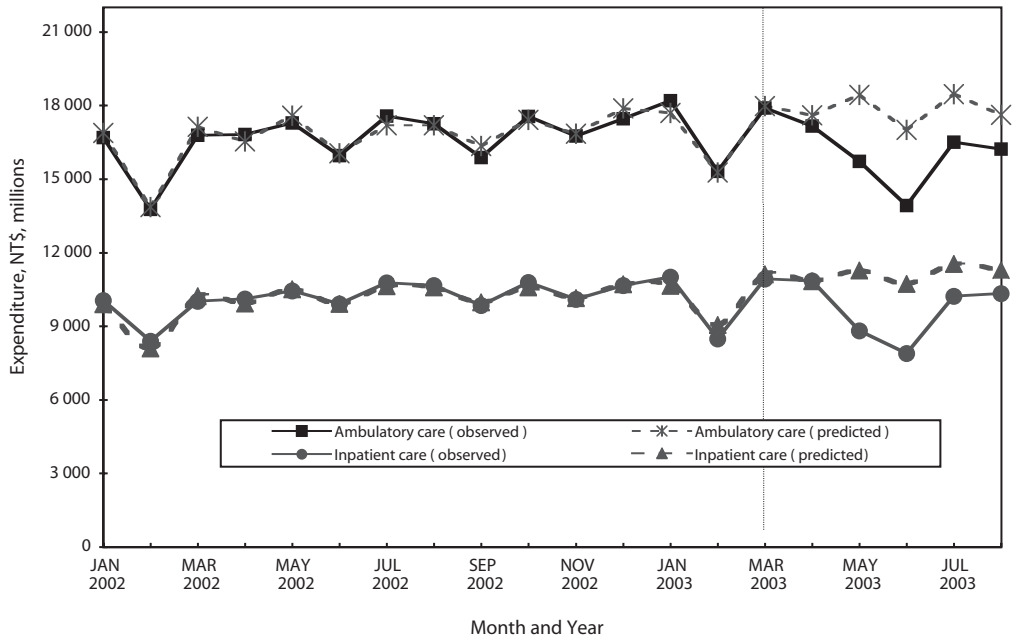
Since the outbreak of severe acute respiratory syndrome (SARS), its etiology, transmission routes, treatments, and outcomes have received much research attention.[1–5] SARS has low mortality and morbidity; however, the health consequences of the SARS epidemic are not limited to people who have been infected.[6] The potentially serious impact of SARS on people's accessibility to medical services should not be overlooked.[7–10] However, no study has systematically evaluated the impact of the fear of SARS on the general population.

People's fears of SARS were mainly caused by its novel, rapid nosocomial transmission, and the vulnerability of hospitals and health care workers. Many wondered whether the fears of SARS among patients and health care workers alike deterred people from seeking care or providers from offering services. Therefore, a critical challenge is to determine how public health agencies should respond to utilization changes and possible accessibility barriers to the general population created by the SARS epidemic. In this study, we aimed to assess how people's fears of SARS influenced their utilization patterns of medical services in Taiwan.

METHODS

The SARS epidemic in Taiwan started in mid-March 2003 and lasted for almost 4 months. The epidemic was effectively contained during the initial SARS period (March 14 to April 21, 2003).[11] However, multiple clusters of hospital outbreaks among patients and health care workers initially struck at the end of April and extended to May and June, dramatically exacerbating the epidemic. As a result, overwhelming fears of SARS spread over the entire island along with the SARS epidemic. The situation persisted until July 5, when Taiwan was officially removed from the World Health Organization's list of SARS-affected countries.[11,12]

We retrieved all claims made to the National Health Insurance program between January 1, 2000, and August 31, 2003, including inpatient care, Western medicine ambulatory care, Chinese medicine services, and dental services. An interrupted time-series design was used. Trends for different types of services were analyzed separately to determine whether utilization changes were specific to certain services. The time-series autoregressive-moving average (ARIMA) analysis[13] was applied to determine whether the SARS epidemic was significantly associated with changes in medical service utilization rates. Relative differences between observed and ARIMA-predicted values were expressed in percentages. All analyses were performed



Note. NT$ = New Taiwan dollars.

FIGURE 1—Observed and predicted expenditures for ambulatory and inpatient care in the preepidemic, epidemic, and postepidemic periods, January 2002 through August 2003. The date of the initial outbreak is marked with a vertical line.

using SAS for Windows, Version 8.2 (SAS Institute Inc, Cary, NC) and Stata 8.0 (Stata Corp, College Station, Tex).

RESULTS

Figure 1 compares the observed trends in expenditures for ambulatory and inpatient care in Taiwan with the predicted trends estimated by the ARIMA model that assumes the absence of the SARS epidemic. During the epidemic, the figure shows significant reductions in observed expenditures compared with those expected. The general patterns for both ambulatory and inpatient services were quite similar and corresponded to each transition period of the SARS epidemic. Correspondingly, virtually no impact was observed before the first hospital cluster in late April, when the epidemic was effectively contained. A significant reduction was observed in May and continued to expand significantly in June, when the fears of SARS grew after the expansion of the epidemic to all of Taiwan. Finally, the expenditures increased gradually in July and August after the SARS epidemic was over. Compared with ambulatory care, inpatient care experienced larger reductions in expenditure at the peak period and rebounded to levels closer to usual values toward the end of the epidemic. This suggests that the SARS epidemic had a stronger influence on inpatient services than on ambulatory services.

Although the responses of medical service expenditures were similar to those of medical service utilization, reductions in utilization were relatively larger. Inpatient services experienced the largest reduction (35.2%), followed by dental services (23.9%) and Western medicine ambulatory services (16.7%) at the peak of the SARS epidemic (Table 1). On the other hand, unlike other types of medical services, Chinese medicine services experienced an increase in utilization (1.8%) during the SARS epidemic. One plausible explanation may be that Chinese medicine services served as a substitute for Western medicine ambulatory services.

DISCUSSION

Over the study period, we observed significant utilization reductions at the peak of the SARS epidemic. Overall, this short-term impact on utilization reductions translated into an approximate $18.8 billion new Taiwan dollars decrease (approximately 6% of the annual National Health Insurance expenditure) in health care expenditure during the SARS epidemic from April 2003 through August 2003. The results strongly suggest that the fears of SARS significantly influenced people's care-seeking behavior and that this fear seriously compromised their accessibility to quality care.

Although all the international attention is focused on the direct causes of SARS, serious health consequences resulting from people's fears of SARS should not be overlooked. The results presented here could provide public health agencies with a more complete picture of overall health impacts of the SARS epidemic, so that when SARS re-emerges, it can guide public health officials to prevent avoidable health consequences because of the fears people have regarding SARS. ■

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TABLE 1—Observed and Predicted Monthly Medical Expenditures and Utilizations, by Type of Medical Service: Taiwan, January 2003 through August 2003

	Pre-SARS and Initial SARS Period			Peak SARS Period				Post-SARS Period			
	Jan–Mar, Avg $/No.	April, $/No.	Difference, %	May, $/No.	Difference, %	June, $/No.	Difference, %	July, $/No.	Difference, %	August, $/No.	Difference, %
					Expenditures						
Inpatient care											
Observed	10 143	10 845	0.1	8808	−21.9	7888	−26.5	10 228	−11.3	10 334	−8.3
Expected	10 269	10 839		11 278		10 729		11 533		11 272	
Ambulatory care											
Observed	17 131	17 161	−2.5	15 726	−14.7	13 922	−18.1	16 503	−10.6	16 226	−7.9
Expected	16 977	17 601		18 427		17 006		18 467		17 623	
Dental care											
Observed	2297	2339	−9.1	1991	−23.5	2083	−16.3	2538	−7.2	2495	−2.8
Expected	2323	2572		2603		2488		2736		2568	
Chinese medicine											
Observed	1343	1458	0.8	1418	−8.3	1331	−1.4	1454	−4.7	1450	2.0
Expected	1362	1446		1546		1351		1525		1421	
					Utilization						
Inpatient care											
Observed	241	245	−6.3	180	−32.4	167	−35.2	227	−16.8	228	−15.7
Expected	245	262		266		258		272		271	
Ambulatory care											
Observed	23 117	22 525	1.3	18 665	−22.2	15 744	−23.9	18 668	−18.1	19 043	−11.1
Expected	22 323	22 245		23 979		20 692		22 783		21 418	
Dental care											
Observed	2040	2055	−9.7	1717	−25.3	1833	−16.7	2269	−5.6	2231	−1.4
Expected	2073	2275		2299		2201		2404		2262	
Chinese medicine											
Observed	2454	2654	5.4	2558	−5.8	2359	1.8	2575	−1.4	2606	7.2
Expected	2430	2519		2715		2319		2612		2431	

Note. Avg = monthly average; $ = new Taiwan dollars in millions; No. = number of visits per admissions in thousands; Difference = [(observed value − predicted value)/predicted value] 100. The official exchange rate for 2003 published by the Central Bank of China is 1 US$ = 34.24 New Taiwan $. Available at: http://www.cbc.gov.tw. Accessed February 26, 2004.

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Contributors

H.J. Chang planned the study and supervised all aspects of its implementation. N. Huang assisted with the study and led the writing. C.H. Lee synthesized analyses and contributed to the writing of the article. C.J. Hsieh assisted with the data management and the study. Y.J. Hsu assisted with the study and analyses. Y.J. Chou planned the study, completed the statistical analysis, and supervised the study implementation. All authors helped to conceptualize ideas, interpret findings, and review drafts of the brief.

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Human Participant Protection

No protocol approval was needed for this study.

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